

CLAIMS

1. A multi-layered printed wiring board with an inner layer circuit characterized by comprising:

a primer resin layer, constituted exclusively of a resin, between said inner layer circuit without roughening treatment and an insulating resin layer.

2. The multi-layered printed wiring board according to claim 1, comprising a surface layer plated with tin, nickel or an alloy of these metals on the surface of said inner layer circuit.

3. The multi-layered printed wiring board according to any one of claims 1 to 2, comprising a silane coupling agent layer between said inner layer circuit and said primer resin layer.

4. The multi-layered printed wiring board according to any one of claims 1 to 3, in which said silane coupling agent is selected from an amino-functional silane coupling agent and/or a mercapto-functional silane coupling agent.

5. The multi-layered printed wiring board according to any one of claims 1 to 4, in which the cross sectional thickness of said primer resin layer is 1 micron m to 10 micron m.

6. The multi-layered printed wiring board according to any one of claims 1 to 5, in which said primer resin layer is formed of a resin mixture comprising 20 to 80 parts by weight of an epoxy resin, 20 to 80 parts by weight of a solvent-soluble aromatic polyamide resin polymer and a curing accelerator added in an appropriate amount according to need.

7. The multi-layered printed wiring board according to any one of claims 1 to 6, in which the aromatic polyamide resin polymer used for said primer resin layer is reaction product between an aromatic polyamide and a rubbery resin.

8. The multi-layered printed wiring board according to any one of claims 1 to 5, in which said primer resin layer is formed of a resin mixture comprising 20 to 50 parts by weight of an epoxy resin (inclusive of a curing agent), 50 to 95 parts by weight of a poly-ethersulfone resin (having a hydroxy-functional or amino-functional at a terminal thereof, and soluble in a solvent), and a curing accelerator added in an appropriate amount according to need.

9. A method for manufacturing the multi-layered printed wiring board of the present invention, characterized by comprising the steps of:

(a) producing of a primer resin sheet with a carrier film by coating a resin composition coat as a 2 micron m to 12 micron m thick primer resin layer on the surface of the carrier film and semi-cure the resin composition coat;

(b) bonding of primer resin sheet by superposing the surface of the primer resin sheet with a carrier film against the inner layer circuit board to place the primer resin sheet on the formed inner layer circuit on the inner layer circuit board constituting the multi-layered wiring board, and then release the carrier film;

(c) processing to form a multi-layered copper clad laminate in which primer resin sheet lies along the surface shape of the inner layer board by superposing a pre-preg and a metal foil for a conductive layer on the primer resin sheet and hot-press the book; and

(d) etching of the outer layer copper foil of the multi-layered copper clad laminate to finish the multi-layered printed wiring board with outer layer circuit by forming an outer layer circuit.

10. A method for manufacturing the multi-layered printed wiring board of the present invention, characterized by comprising the steps of:

(a) coating of a primer resin for forming a 2 micron m to 12 micron m thick primer resin layer in a B-stage by coating a resin composition for the primer resin composition onto the formed inner layer circuit surface of the inner layer circuit board;

(b) pressing for forming a multi-layered copper clad laminate by superposing a pre-preg and a metal foil for a conductive layer on the primer resin layer, and hot-press to get multi-layered printed wiring board with primer resin layer which lies along the surface shape of the inner layer board; and

(c) etching of the outer layer copper foil of the multi-layered copper clad laminate to finish the multi-layered printed wiring board with outer layer circuit by forming an outer layer circuit.

11. A method for manufacturing the multi-layered printed wiring board of the present invention, characterized by comprising the steps of:

(a) producing of a primer resin sheet with a carrier film by coating a resin composition coat as a 2 micron m to 12 micron m thick primer resin layer on the surface of the carrier film and semi-cure the resin composition coat;

(b) bonding of primer resin sheet by superposing the surface of the primer

resin sheet with a carrier film against the inner layer circuit board to place the primer resin sheet on the formed inner layer circuit on the inner layer circuit board constituting the multi-layered wiring board, and then release the carrier film;

(c) pressing for forming a multi-layered copper clad laminate in which primer resin sheet lies along the surface shape of the inner layer board by superposing a resin coated metal foil on the primer resin sheet and hot-press to laminate; and

(d) etching of the outer layer copper foil of the multi-layered copper clad laminate to finish the multi-layered printed wiring board with outer layer circuit by forming an outer layer circuit.

12. A method for manufacturing the multi-layered printed wiring board of the present invention, characterized by comprising the steps of:

(a) coating of a primer resin for forming a 2 micron m to 12 micron m thick primer resin layer in a B-stage by coating a resin composition for the primer resin composition onto the formed inner layer circuit surface of the inner layer circuit board;

(b) pressing for forming a multi-layered copper clad laminate in which primer resin sheet lies along the surface shape of the inner layer board by superposing a resin coated metal foil on the primer resin layer and hot-press to laminate; and

(c) etching of the outer layer copper foil of the multi-layered copper clad laminate to finish the multi-layered printed wiring board with outer layer circuit by forming an outer layer circuit.

13. A method for manufacturing the multi-layered printed wiring board of the present invention, characterized by comprising the steps of:

(a) producing of a primer resin sheet with a carrier film by coating a resin composition coat as a 2 micron m to 12 micron m thick primer resin layer on the surface of the carrier film and semi-cure the resin composition coat;

(b) bonding of primer resin sheet by superposing the surface of the primer resin sheet with a carrier film against the inner layer circuit board to place the primer resin sheet on the formed inner layer circuit on the inner layer circuit board constituting the multi-layered wiring board, and then release the carrier film;

(c) pressing for forming a multi-layered copper clad laminate in which primer resin sheet lies along the surface shape of the inner layer board by superposing a skeletal material reinforced resin coated metal foil on the primer

resin layer and hot-press to laminate; and

(d) etching of the outer layer copper foil of the multi-layered copper clad laminate to finish the multi-layered printed wiring board with outer layer circuit by forming an outer layer circuit.

14. A method for manufacturing the multi-layered printed wiring board of the present invention, characterized by comprising the steps of:

(a) coating of a primer resin for forming a 2 micron m to 12 micron m thick primer resin layer in a B-stage by coating a resin composition for the primer resin composition onto the formed inner layer circuit surface of the inner layer circuit board;

(b) pressing for forming a multi-layered copper clad laminate in which primer resin sheet lies along the surface shape of the inner layer board by superposing a skeletal material reinforced resin coated metal foil on the primer resin layer and hot-press to laminate; and

(c) etching of the outer layer copper foil of the multi-layered copper clad laminate to finish the multi-layered printed wiring board with outer layer circuit by forming an outer layer circuit.

15. The method for manufacturing the multi-layered printed wiring board according to claim 13 or 14, using the skeletal material reinforced resin coated metal foil which is manufactured by the steps of:

(a) forming a varnish layer with predetermined thickness on the surface of a metal foil as a coat by use of a thermosetting resin varnish;

(b) preliminarily drying the varnish layer on the surface of the metal foil by drying the varnish layer to be a dried resin layer;

(c) preliminarily bonding a skeletal material onto the surface of the dried resin layer coated on the surface of the metal foil by superposing the skeletal material thereon and preheat to bond the skeletal material thereon;

(d) impregnating the thermosetting resin into said skeletal material mounted on the surface of the metal foil by heating up at a temperature at which the resin becomes again fluidizable ; and

(e) cooling the resin impregnated skeletal material for fabricating the skeletal material reinforced resin coated metal foil by cooling the resin immediately after completion of the resin impregnation to prevent full curing and keeping semi-cured stage of the thermosetting resin impregnated into the skeletal material.

16. The method for manufacturing the multi-layered printed wiring board

according to any one of claims 9, 11 and 13, in which the resin composition used for forming said primer resin layer is obtained by the steps of:

(a) preparing a resin mixture by mixing 20 to 80 parts by weight of an epoxy resin, 20 to 80 parts by weight of a solvent-soluble aromatic polyamide resin polymer and a curing accelerator added in an appropriate amount according to need; and

(b) preparing a resin composition having 25 wt% to 40 wt% of a solid resin content by dissolving the resin mixture in an organic solvent.

17. The method for manufacturing the multi-layered printed wiring board according to any one of claims 10, 12 and 14, in which the resin formulation used for forming the primer resin layer, which is formed on the surface of the inner layer circuit board by a coating process, is obtained by the steps of:

(a) preparing a resin mixture by mixing 20 to 80 parts by weight of an epoxy resin, 20 to 80 parts by weight of a solvent-soluble aromatic polyamide resin polymer and a curing accelerator added in an appropriate amount according to need; and

(b) preparing a varnish with resin composition having 8 wt% to 15 wt% of a solid resin content by dissolving the resin mixture in an organic solvent.